NATIONAL ENERGY AUDIT PROGRAM - OVERVIEW

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NATIONAL BUS PROGRAM - OVERVIEW

The Government of Canada, with provincial co-operation, offers at no cost to companies and institutions, a multi-faceted energy management and energy conservation program designed to assist them to improve their energy-use efficiency and reduce expenditures for fuel and electricity.

Companies and institutions must first become aware of the nature and magnitude of energy waste, as well as the cost savings and other benefits to be realized by themselves and society from more efficient utilization of energy. Only then - - will firms initiate internal energy management programs leading to the motivation of employees and the investment of time and resources in conservation efforts. At this stage, information must be readily available on the techniques of energy audits and analysis, as well as procedures and engineering practices to implement corrective measures using state-of-the-art technology.

To assist these companies to become aware of energy waste and identify opportunities to reduce energy costs, the Canadian Government has implemented a comprehensive information and awareness program. One of the most effective innovations of this program is the mobile Energy Audit Vehicle more popularly known as the Energy Bus. These vehicles, endorsed and widely accepted by industry, help to identify energy conservation opportunities at the plant level by means of on-site energy audits.

The energy buses, owned by the Federal Government and operated by the Provinces under federal-provincial agreements, perform preliminary energy audit/analysis at industrial, commercial and institutional locations where such service is requested. By means of a computer located on the bus, analysis of plant energy use patterns and the potential for energy savings is performed. There is no cost to the client company for this service which includes:

1. Computer assisted energy audits, using data provided before-hand by the client, supplemented by data obtained on site by the energy bus personnel;

2. Presentation of audit results to plant management via video display and also by hard copy printouts;

3. Energy utilization demonstrations by means of models or audio visual techniques; and

4. Discussion with chief executive officers and plant management on the nature and magnitude of potential energy savings and preliminary advice on steps to be taken by the client.

PROGRAM COVERAGE

An original idea conceived and developed in Canada, the Energy Bus was pioneered by the Province of Ontario in 1975. In August 1977, the Federal Government, in co-operation with the governments of Prince Edward Island and Nova Scotia, initiated what is now properly known as the Energy Bus Program as an important element of their Ener$ave for Industry and Commerce Program. The immediate acceptance and success of the program in industry and by provincial governments prompted the Federal Government to expand this low cost - high profile program to all interested provinces.

In June 1978, the program evolved into a National program when the provinces of British Columbia, Ontario, Quebec, and New Brunswick joined the program, followed by Saskatchewan and Newfoundland in January 1979 and Alberta in April 1980, while Manitoba's bus was received on November 21st, 1980.

FEDERAL/PROVINCIAL AGREEMENT

The energy buses are purchased and owned by the federal government and are operated by the provincial governments under terms of cost sharing agreements. The capital cost of the bus, equipped with two mini computers was approximately $135,000 and was paid for by the federal government. The original energy bus agreement was for three years and the federal government cost shared 50 - 50 with the provinces the operating costs for the first two years, with the provinces

responsible for full operating costs during the third year. The original Energy Bus Agreement was superceded by the Canada-Manitoba Agreement on Industrial Energy Conservation executed September 20, 1982. This Agreement provides for a second Energy Bus (Mini-Bus) and an Osborne portable computer with the costs of operation being shared on an 80 - 20 basis. Operating costs for the energy buses which would include staff, insurance, gas, and normal servicing, travel and accommodation, etc. This does not include administrative costs and will vary between provinces.

IDENTIFIED POTENTIAL SAVINGS

A summary of some 2400 bus visits reports, potential savings of close to $19,000,000 were identified from total energy bills totalling approximately $90,000,000 and could be realized by industry and commerce at minimum or no capital cost with the implementation of energy conservation practices or through more efficient use of energy. It must be pointed out that these figures do not include the results of the Ontario program which they originated in 1975. That phase of their program, prior to joining the federal/provincial program in June 1978, conducted 900 visits, reviewing energy bills totalling $300,000,000 with identified potential savings of $40,000,000.

This averages out to 18% identified potential savings per energy bus visit with savings of 20-30% - and even 50% not uncommon. This is quite an impressive result to date considering the relatively short period of time that the majority of provinces have been operating their programs.

While it will vary from province to province, the current backlog or waiting period for an energy bus visit is between three weeks to four months, which is another indication of the acceptance and success of the program by industry and commerce in Canada.

STATISTICAL DATA BASE

While the energy bus program was developed as primarily one of awareness, there are, as just noted, tangible results to be obtained. A very significant benefit of the program is the Statistical Data Base or Information and Retrieval System. During an energy audit an extensive amount of data is recorded in the computers as a prerequisite to calculating energy use patterns and areas of energy waste upon which energy reduction opportunities are identified (i.e. type of industry, types of energy used, energy consumption, energy costs, unit of production, square footage, year of construction, degree days, days in heating/cooling season, etc.). Much of this data is unique to the bus program and has either not been available before or only through costly one-time surveys.

From this data, which remains confidential and is available as an aggregate only, it is possible to develop a profile of different industries to further assist industry and commerce measure their energy use efficiency.

The data base can also be used to measure the effectiveness of various federal/provincial sponsored programs and to determine the impact of current, or the need for future programs.

This data base concept is endorsed by industry as a very meaningful tool by which they can measure their progress in the area of energy management.

INTERNATIONAL INTEREST

International acclaim of the Canadian Program and recognition of its potential has generated a great deal of interest from IEA and EEC countries. As a result of a presentation in Ottawa in June 1979 to nine Member States, five countries, Netherlands, Germany, Luxembourg, Belgium and Italy, have decided to implement a similar program

modeled after the Canadian Program. This will include the exchange of technical information, computer software and expertise, including the development of an International Statistical Data Base.

United States has shown a great deal of interest and a signing of a Canada/U.S.A. agreement is imminent. This will further enhance the international aspect of the Program and Data Base information.

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NATIONAL BUS PROGRAM - ENERGY BUS AUDIT

WHAT IS AN ENERGY BUS AUDIT

As previously indicated, the energy audit vehicle, or Energy Bus, will visit industrial, commercial or institutional establishments to perform on-site energy audits using data provided by the client prior to the visit and further data obtained during the audit. The length of an actual audit varies between 1/2 to 3 days depending upon the complexity of the establishment, but normally will take 1 day. The audit consists of five basic steps:

1. Recording of energy and related data;
2. Physical inspection of the plant or building;
3. Analysis of all data;
4. Documentation and presentation of data; and
5. Recommendations.

Each Energy Bus must operate as a self contained unit during an on-site visit. The unit consists of three main parts which together make an innovative method of achieving energy savings in industry and commerce. These components are:

1. An experienced audit team comprising of engineers and technicians, capable of rapidly analysing energy flows at the audit site; recommending energy conservation actions and calculating, using computer programs, values of potential savings resulting from their recommendations.

2. A mobile audit vehicle capable of transporting and operating computer equipment and measuring instruments in addition to having a small conference area suitable for audit team to present their findings to senior management of the company.

3. A set of mobile computer analysis programs especially designed for the energy bus audit enabling the audit team to rapidly analyse and calculate potential energy savings and to capture

the information in a manner which will have the greatest impact on the people who can take actions to save energy.

These three components taken together, form the Energy Bus Audit Program and make it possible to perform rapid energy audits which produce results to a predictable accuracy.

WHY AN ENERGY AUDIT PERFORMED

To reinforce what was said earlier, the purpose of the Energy Bus Program is to bring to industry and commerce an awareness of energy conservation opportunities and to recommend corrective actions which will reduce energy consumption and costs. Assistance is also given in the development and implementation of an energy management program.

Who the energy bus will visit and the method in performing the audit will vary from province to province and region to region, depending on density of industry, size of audit site, energy consumption to mention a few of the criteria of a visit. Primarily the energy buses visit small to medium size energy consumers who may not possess the resources or technically qualified personnel to perform an energy audit or take corrective actions.

Normally the energy bus visit is a first step on the road to greater energy efficiency. It identifies energy saving opportunities which require low or no initial investment and recommends areas which require further investigation.

Do not expect the audit team to give estimates of the cost for installing energy conservation equipment as this is beyond the intended scope of the program. Similarly, they do not investigate the internal efficiency of industrial processes or equipment as this requires a special expertise.

HOW IS AN ENERGY AUDIT PERFORMED

The energy audit and subsequent presentation to senior management is conducted generally in the following pattern, but naturally, this will vary according to the client and the provincial energy audit team.

1. AUDIT FORM

Prior to an Energy Bus visit, an energy audit form is forwarded to the client which must be completed and returned to the proper provincial authority. This is quite often a time consuming exercise for the client but it is an essential first step in performing an energy audit. The types of energy purchased or used: quantity consumed, dollar value, size of plant or building, insulation values, window areas, type of business and the type of equipment using the energy, are a few of the items which must be known before an audit can begin. The quality of input from the audit form will influence the quality of the actual audit and quite often, the completion of the audit form is the beginning of the awareness process for the client.

2. PRE-AUDIT ANALYSIS

Some energy bus audit teams perform a pre-audit analysis of the data which has been made available and when time permits. Data from the audit form is entered into the computer and is analysed to produce energy use patterns which can quite often identify areas of excess waste before arriving at the site to be audited.

3. BUS VISIT INTERVIEW

Prior to the start of the energy audit, the audit team will meet with representatives of the company being audited, preferably the manager and technical person in authority, to discuss and verify the information that was supplied on the audit form and obtain any missing or additional

information which is required. Requests for more detailed information such as building or plant drawings or process specification might be made at this time. The objectives and audit procedures are explained at this time and any particular concerns of the manager are discussed.

4. WALKTHROUGH

A guided tour of the facilities, by responsible plant management, follows the interview and is a very important element of the audit. This stage of the audit is commonly known as the "walkthrough" and enables the audit team to familiarize themselves with the operation of the plant or building. They will collect data on the movement of energy through the system; take measurements of the energy flows; observe operational methods concerning the use of energy and record data about the site such as building construction and process methods.

5. COMPUTER ANALYSIS

An inter-active computer analysis is now conducted on the energy bus, using data from the audit form as supplied by the client - - from drawings or plans which have been referenced - - - from measurements taken on site - - and general observation recorded by the audit team during the "walkthrough." Detailed calculations on energy use and energy flows between processes are made and the results of energy conservation actions in the form of savings in dollars and energy units are determined. The analysis and calculations use a set of computer programs developed especially for the energy bus program. They require data that is relatively easy to obtain and produce hard copy reports in a format readily understood by non-technical managers.

6. PRESENTATION

To complete the audit, a presentation is made by the audit team to senior management of the company as well as plant or building managers. The presentatation usually includes discussion of their

operation, patterns of energy use and a list of recommended energy conservation opportunities. The discussion provides an opportunity for management to make suggestions of their own and to respond to the recommendations by the audit team.

Whenever possible, calculated values of potential savings are left with the client to assist them in future studies which they wish to undertake as part of their energy management program.

A final set of computer reports are produced indicating potential savings which can be realized and the various areas which should be investigated. These reports are very important and can be a starting point for implementing many energy management actions.

POOR

QUALITY

ORIGINAL